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High School Standings of Pupils from Graded and Ungraded Elementary Schools

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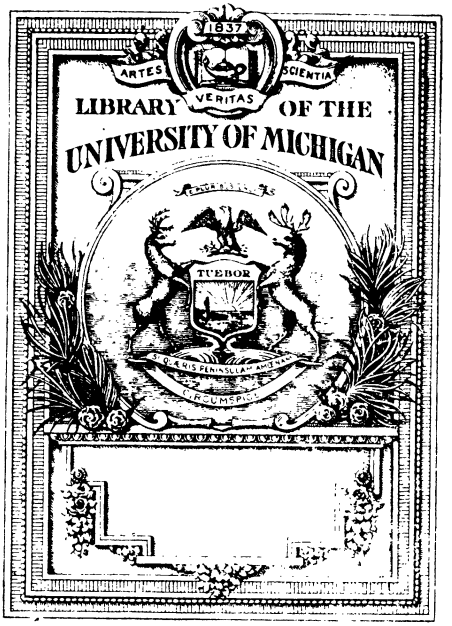
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High School Standings of Pupils from Graded and Ungraded Elementary Schools*

C. O. Davis
University of Michigan

THE subject of the present study is expressed in the title above. The results were obtained from computations upon data secured from nine Michigan high schools, viz., St. Louis, Chelsea, Buchanan, Sturgis, Howell, Spring Lake, Wayne, New Baltimore and Lyons. The study fell naturally into two parts, the first dealing with all the pupils' marks of the nine schools, irrespective of subjects, and the second with the marks of distinct groups of the same pupils given separately for the different subjects. These marks or grades are given by letters in each case, as they were in the school reports from which they were compiled.

PART I.

As just mentioned above, this part of the study has to do with the marks of all the pupils in the nine schools without reference to subjects. It consists, as will the second part also, of explanatory comment on the computations, illustrative graphs and tables, and conclusions based upon the results obtained. The

*The accompanying study was the result of a co-operative investigation undertaken by certain members of one of the writer's administration course in the University of Michigan. The data were collected by several students after they had left the University and entered upon the actual administration of schools. The material thus collected was then transmitted to the writer and was compiled by young men and young women of the succeeding class in administration. The conclusions and deductions here presented are entirely the product of the young people themselves working under the general direction of the writer. Needless to state, no one is of the opinion that sufficient data have been collected to warrant any positive conclusion. The material is merely presented in order to show the scheme of the investigators and to stimulate further effort. It is the plan and expectation of the writer to continue to accumulate material on the same subject and he has at the present time a group of his former students gathering further facts with this end in view.

The investigators of this report were the superintendents of the schools in seven of the smaller towns of Michigan, one high school principal, and one class room teacher, namely C. D. Dawson (St. Louis), F. Hendry (Chelsea), A. Watkins (Sturgis), E. L. Abell (Howell), E. Winter (Spring Lake), R. E. Roycroft (Wayne), A. Rather (New Baltimore), E. Soule (Lyons), and N. Richmond (Buchanan). The compilers of the data and the writers of the descriptive material are M. E. McCarty and C. E. Wenger.

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investigations upon which it is based involve approximately 1100 pupils ranging for the several schools between 289 at Chelsea and 12 at Lyons. In three of the schools the number reported decreases from the first to the eighth semester, from which it is thought that the whole number in attendance was reported in these cases, the decrease showing the elimination toward the year of graduation.

In the remaining six schools the number of graded and ungraded school pupils is definitely given and remains constant for the four years. Obviously it is only graduates that appear in these cases. Here it was only the number of boys and girls that had to be determined. The common suggestion under which all the investigations were made was that one mark was to be counted for each subject pursued each semester by each pupil, and that, since each pupil ordinarily carries four subjects, the total number of marks for each school in any one semester would usually be just four times the number of pupils. The number of marks was definitely given in every case. By dividing this number by four, then, the number of pupils and the number of each sex as well could be fairly accurately determined.

In two of the schools, Chelsea and New Baltimore, the number of pupils by semester and by sex were both given and a comparison of these served as a check upon the results in the other cases where the numbers were computed by the above method. Where the numbers are not constant and elimination is not active there are scarcely any variations and the few found are so small as to be easily explained by the usual variations in school attendance.

The number of marks given per semester in each school ranged from about 1100 in Chelsea to approximately 50 in Lyons. The number was computed separately for the graded and the ungraded school pupils and also for the boys and girls within each of these groups, and upon this basis the range in number of marks ran from 288 given the graded school girls at Howell in the eighth semester to 4 given graded school boys at Wayne in the same period. For the whole nine schools together the range was from 1541 marks given the graded school girls in the first semester to 432 given the ungraded school boys in their seventh semester.

The ranges above are given chiefly to convey an idea of the number of pupils and marks involved so as to enable one to

judge better of the value of whatever conclusions are made. They may also serve to show that the number of graded school pupils is always larger than that of ungraded ones, unless a fixed equal number is selected to report, and the number of girls is also far in excess of the number of boys. The three schools where elimination was active upon pupils involved in the reports had much to do of course in causing the first semester numbers to exceed those following.

The investigations covered various periods ranging from two years in Spring Lake and three in Lyons to sixteen years in New Baltimore. In some of the schools all the pupils were investigated for a long period and in others only a small group for a single high school cycle. All sorts of pupils, therefore, are represented, not merely a select group either of graduates or of brilliant pupils from select epochs in the histories of the schools studied.

The initial letters of the alphabet were used as a grading system in all nine of the schools. Three of them, however,—Sturgis, Howell and Lyons,—used a trinodal system, giving no D's nor E's.

The total number of each of the five sorts of marks for each school were tabulated for each sex and semester in separate tables for the graded and ungraded school pupils and a computation table was then made showing what per cent. these separate totals were of the whole number of marks given in each case. To illustrate, in the first semester of high school the boys of Sturgis from ungraded elementary school were given 8 marks of which 4 were A's and 4 B's. The computation table, therefore shows 50% A's and 50% B's. In a like manner all the groups and periods in the nine schools were dealt with and the results for the ungraded and graded schools placed one above the other for comparison. The percentages of each of the five marks for each sex and semester were then totaled for all the schools, with the results for graded and ungraded school pupils in contrast as before. Table I following shows the totals for A's and B's computed in this manner through the eight semesters. For convenience the graded and ungraded school pupils will hereafter be referred to as resident and nonresident,—or boys and girls as the case may require.

The resident boys are seen to have an advantage in the percentage of A's in all but the sixth and eighth semesters where

TABLE I.

PERCENTAGES OF A'S AND B'S BY SEMESTER FOR NINE SCHOOLS

A's

Semesters	1st	2nd	3rd	4th	5th	6th	7th	8th
Nonresident Boys	28.6	27.9	32.3	37.2	36	38.6	41.2	47.4
Resident Boys	29.7	34.3	34	38.1	37.3	35.8	41.4	42.5
Nonresident Girls	39.4	46.7	44.6	48.2	49.2	53.3	55.3	41.9
Resident Girls	41.3	47	43.3	47.9	47.8	50.7	51	52.5

B's

Semesters	1st	2nd	3rd	4th	5th	6th	7th	8th
Nonresident Boys	41.8	48	38.7	38.3	39.8	39.6	36.1	34.1
Resident Boys	42.6	41.9	42.3	40.5	39.9	44	39	43.2
Nonresident Girls	43	40.1	40.9	38	36.9	34	32	37.1
Resident Girls	40.3	36.8	42.5	37.8	36.6	34.8	34.7	35.5

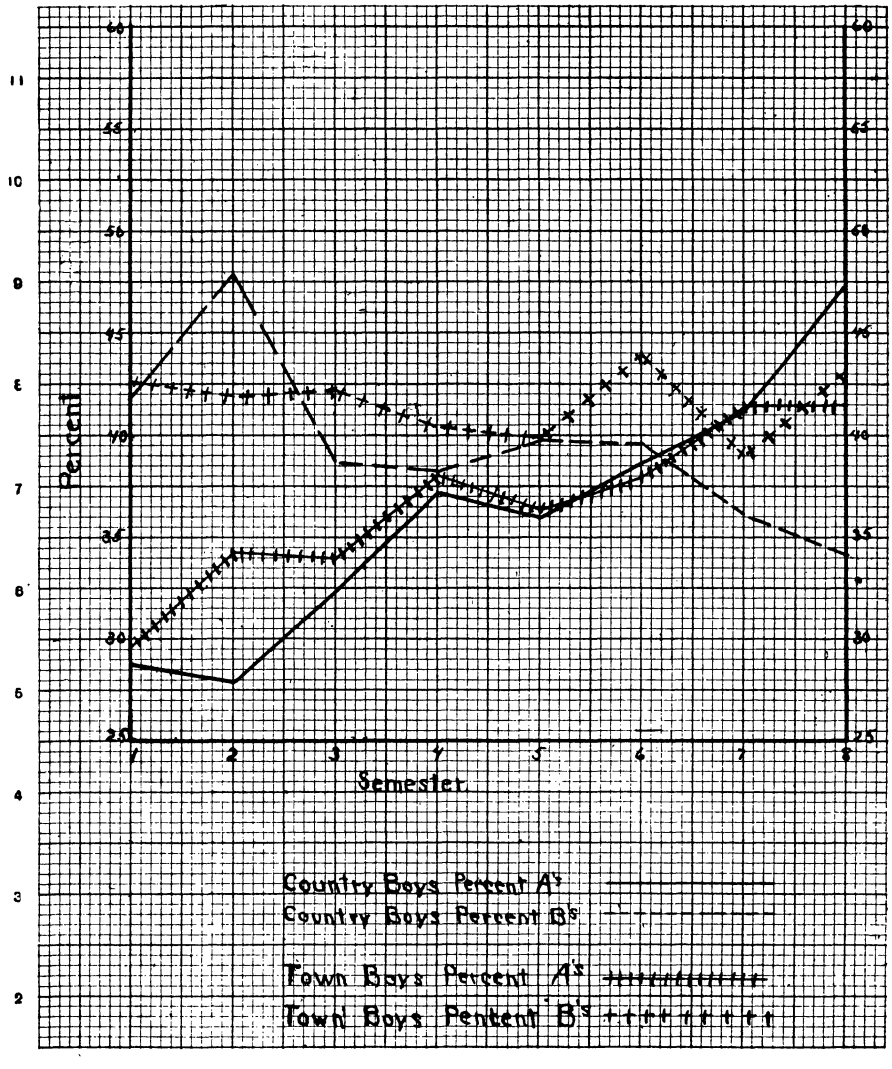
they are at a 2.8 and 4.9% disadvantage respectively. The resident girls, on the contrary, have a slight advantage only in the two first and the last semesters while the nonresident girls excelled in the other five.

In B's, too, the resident boys are ahead, and here for all but one semester, the second, where they are outdistanced by 6.1%. The resident girls again fall behind the nonresidents in three semesters, the third, sixth and seventh.

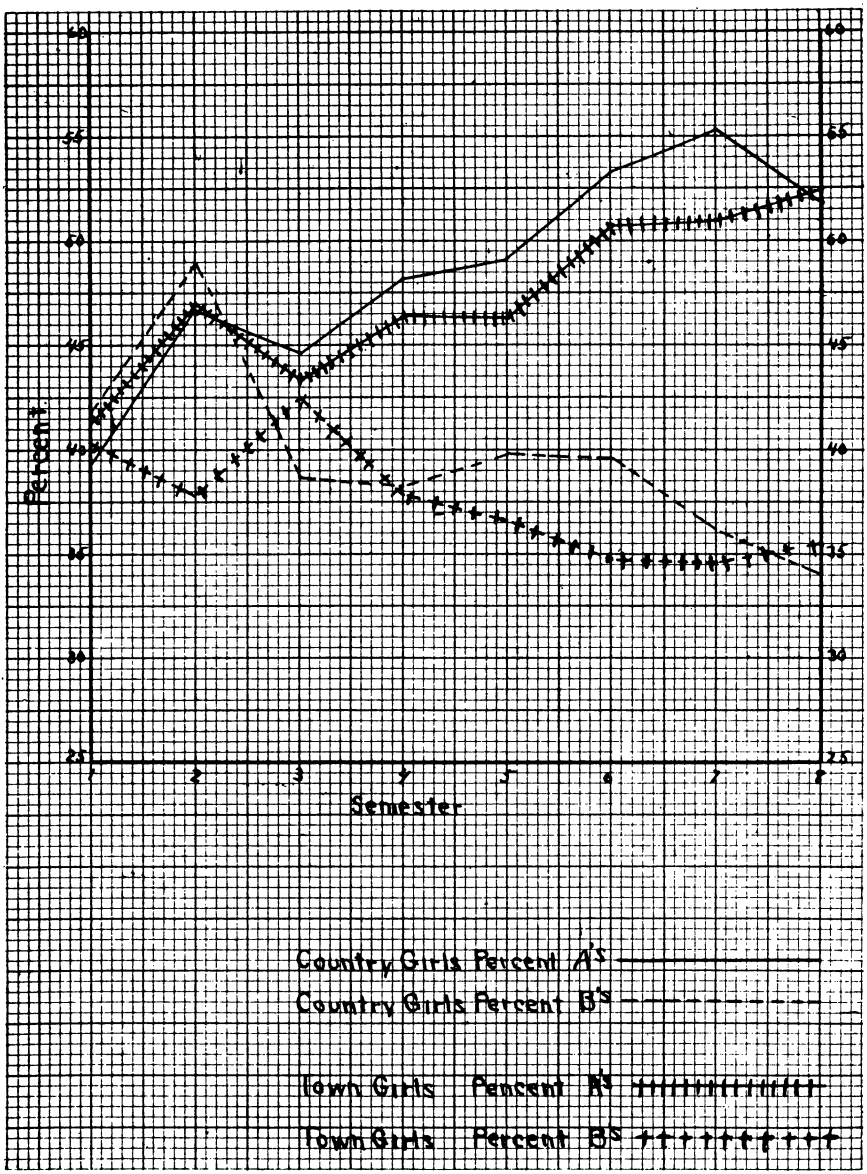
The graphs numbered (1) and (2) which follow serve to emphasize the variations between residents and nonresidents as shown by the table. They are self explanatory, Number (1) shows the percentages of A's and B's for boys and Number (2) those for the girls.

By averaging the percentages in Table I for the eight semesters and then combining the results for boys and girls in each group one is able to get a single figure by which to express the relative standings. Table II below shows the results of this process. The figures obviously represent the percentages for the whole four years of high school and are reduced to extremely small terms by the constant averaging.

It is easily seen that any wide variations in the percentage of either mark for the resident and nonresident pupils within different schools would be entirely obscured by the averaging of the results from the nine schools together as was done above.


Percent
Semester
Country Boys Percent A's
Country Boys Percent B's
Town Boys Percent A's
Town Boys Percent B's

GRAPH I


Semester
Country Girls Percent A's
Country Girls Percent B's
Town Girls Percent A's
Town Girls Percent B's

GRAPH II

TABLE II.

AVERAGES PERCENTAGES OF A'S AND B'S FOR THE EIGHT SEMESTERS

A's

Nonresident Boys	36.1%	
Resident Boys		36.6%
Nonresident Girls	48.6%	
Resident Girls		47.7%
Advantage for the Resident Boys		.5%
Advantage for the Nonresident Girls	.9%	
Total Advantage for the Nonresident Pupils	.4%	

B's

Nonresident Boys	39.5%	
Resident Boys		41.8%
Nonresident Girls	37.8%	
Resident Girls		37.4%
Advantage for the Resident Boys		2.3%
Advantage for the Nonresident Girls	.4%	
Total Advantage for the Resident Pupils		1.9%

To illustrate these wide variations a separate computation was made in which the results for the eight semesters instead of for the nine schools were averaged. The results by this method show the following comparisons which are in marked contrast to those obtained by the former process. The table is Number III and shows the computations for A's only.

TABLE III.

PERCENTAGES OF A'S BY SCHOOLS FOR ALL EIGHT SEMESTERS

I—Nonresident boys. III—Nonresident girls.
II—Resident boys. IV—Resident girls.

	I	II	III	IV	I	II	III	IV
St. Louis	49	43.5	51	52.4	5.5			1.4
Chelsea	23.9	21.9	43.7	50.7	2			7
Buchanan	52	43	62.6	50.2	9		12.4	
Sturgis	60.5	71.9	68.7	71.9		11.4		3.2
Howell	37.8	42.8	47.2	51.1		5		3.9
Wayne	26.4	22.3	45.1	49.1	4.1			4
Spring Lake	18.2	23.5	22.4	33.6		5.3		11.2
New Baltimore	21.6	11.5	26.1	18.8	10.1		7.3	
Lyons	65.3	17.9	45.9	59.3	47.4			13.4
Totals in Advantages					78.1	21.7	19.7	44.1

78.1—21.7 = 56.4% of A's to the final advantage of nonresident boys.
44.1—19.7 = 24.4% of A's to the final advantage of resident girls.

Subtracting = 32% of A's to the final advantage of nonresident pupils.

(The last four columns represent the advantages for each group and are obtained by subtracting I and II and III and IV, referring now to the first four columns. The averages in the case of Wayne are only for four semesters and those for Lyons only for six, since those periods only were reported for each of these schools.)

A study of the table will soon convince one that it would hardly show results suitable as a basis from which to draw valid conclusions. It is given merely to show the wide variability in the percentage of the different marks given in the various schools. These variations are a serious reflection upon the grading systems, or perhaps better to say upon the lack of system in grading in our schools. That there is no common standard among teachers in the matter is well proven by the table above where one school is seen to be giving 71.9% of A's to the resident boys while another school is only giving 11.5% to the similar group among its attendants. If one goes back to the computations from which the above table is derived the variability is still further emphasized. It is discovered there, for instance, that in one school, New Baltimore, no A's at all were given during three of the eight semesters to the resident boys. On the other hand, it is found that Lyons in no case gave its nonresident boys less than 50% of the superior grade. Other extremes almost as startling are easily found.

Obviously such extremes as those found above must be correlated and counterbalanced if one is to have results from which to draw conclusions that will have a valid significance. By averaging the percentages for all of the schools as was done to secure the results in Tables I and II such a counterbalancing was achieved. By that method the extremes in one direction were balanced against those in the opposite direction and a reasonable mean thereby obtained. Upon the basis of the results secured in that manner one may draw the following general conclusions:

1. Boys from ungraded elementary schools average lower in their high school grades during the first five semesters of their school course, run about equal with the graded school boys through the sixth and seventh semesters, and then take a decided advantage in the last semester.

2. The nonresident girls receive lower grades than the resident ones during the first two semesters in high school, overtake them in the third and win an increasing advantage which culminates in the seventh, after which they again drop a margin below in the final half year.

3. Both resident and nonresident girls receive higher grades than boys all through the high school course, ranging about 10% higher in A's and a small percentage better in B's also.

4. In general, as the number or percentage of A's increases that of the B's decreases.

5. The number or percentage of A's received by both resident and nonresident pupils and among both sexes tends gradually to increase during the high school course.

6. There is considerably more variation between boys' and girls' grades in any of the five sorts of marks given than there is between the graded and ungraded school pupils.

7. The number of D's and E's given is almost negligible, ranging less than 5% of the whole number of marks in every case.

8. For all school during the whole four years the nonresident pupils have .4% the advantage in the number of A's received while the resident group has an advantage only of 1.9% in B's. (A's are generally considered to have 10 points more value than B's. Upon this basis the .4% advantage of the former group would give them a superiority of 4 points while the 1.9% advantage of the residents would still only give them 1.9 points superiority. Subtracting, the nonresidents would be found 2.1 points in the lead.)

The discovery of such facts as these set forth above lead one to search for explanations. So many factors enter into the matter which can be but little known by investigators not themselves on the ground that much of the attempted explanatory matter of such investigators becomes largely speculation. Upon principles which seem established from general experience, however, one may quite accurately ascribe reasons for some of the variations, at least, that were found.

The comparatively low grades at first of both boys and girls from the ungraded schools is undoubtedly due chiefly to the strangeness of the new high school environment, not only as to material surroundings, but in new methods, companionships and in everything pertaining to the new school life. The advantage that this same class gains over the graded school pupils later in the high school course is often alleged to be due to the greater selection at work in determining the attendance of high school by rural pupils. Being a more select class, as soon as they become accustomed to the new suroundings they outdistance the larger but less selective group from the graded elementary schools of the city. But why this advantage should be lost in the last semester of their high school life by the rural school

girls is quite a puzzle. It may be merely an accident peculiar to the present study, but it is more likely that the extra effort and nerve strain which commencement means to the nonresident girls is a considerable factor in the matter. Whatever the explanation the nonresident boys in this final semester take more than a counterbalancing advantage over the resident ones, so the rural pupils are still slightly in the lead on the whole, having .4% more A's to their credit for the eight semesters, as was seen by Table II above.

Part II.

As part one of the study dealt with the relative standings of resident and nonresident pupils in high school with reference to all their school work, this second part now aims to study these relative standings with particular reference to the subjects pursued. Eight subjects were sufficiently represented in the reports to become a part of the study and the two that were not, composition and agriculture, had some data which could be combined with more of the same sort for a worth while study later. The subjects represented are algebra, geometry, Latin, German, English, history, physical science and biological science.

The number of pupils was not given in the reports from the several schools, but the marks being here all final marks, the two numbers would practically coincide throughout for each subject. This number of marks given ranged, for all pupils, from approximately 5000 in English to about 1100 in biological science.

Taken by resident and nonresident pupils the total number of marks given by subjects ranged from slightly over 3000 given to graded school pupils in English to about 500 given ungraded school pupils in biological science. The ranges show here again that the resident pupils are in the majority. They also show what subjects are most frequently studied by the high school pupils, English being considerably in the lead, history second, and biology and German respectively the least popular, or, at least, the more rarely taken. There is no division for the sexes in this part of the study so the ranges have no significance in that direction.

The same schools are here represented as in part one, except that Wayne is omitted, no report having been received from it for the standings of its pupils by subjects.

The percentage of A's, B's, etc., given in each school and subject were computed after the manner used in part one and the results tabulated separately for resident and nonresident pupil as before. From the showing of these computations graphs and tables are again made, and discussions and conclusions find a basis.

It will be remembered from the showing in Table III that there were wide variations in the number of marks of each sort given within the various schools. This variation appears also when the marks are studied with reference to subjects. The total percentage of A's given by each school for all eight subjects combined is therefore first presented and the percentages by subject for all the schools combined is left as a basis for more valid conclusions later. Table IV, which follows, is presented, therefore, merely to show the extreme variability within the schools, serving the same purpose as did Table III in the previous case. The results were obtained by averaging the per cent. of A's in all subjects for each school.

TABLE IV.

PERCENTAGES OF A'S BY SCHOOLS FOR ALL SUBJECTS

	Percent. Received		*Percent. of Advantage*	
	Nonresidents	Residents	Nonresidents	Residents
St. Louis	45.3	43.6	1.7	
Chelsea	32.6	37.8		5.2
Buchanan	60.3	48.4	11.9	
Sturgis	54.2	73.2		19
Howell	44.7	48.5		3.8
Spring Lake	17.4	29.3		1.9
New Baltimore	16.5	14.4	2.1	
Lyons	34.8	29.1	5.7	
Total Advantages			21.4	39.9

39.9—21.4 = 15.5% of A's to the advantage of resident pupils.

That widely different principles of grading must have been used in the schools is abundantly proven by the above table. The per cent. of A's given is seen to vary from 14.4 for the resident pupils of New Baltimore to 73.2 for the same group at Sturgis. To see the unfairness there would be in using such a table to base conclusions upon one has only to note that Sturgis gives so high a pecentage of A's that there is room for an advantage of 19% for the resident pupils, while this advantage alone is greater than the total number of A's given to either group at New Baltimore. The per cent. given in the latter school being

small, the difference between the per cent. given each group was forced to be still smaller, being actually 2.1% in this case. To these extremes is due the surprising total advantage of 15.5% for the resident pupils. To overcome these irregularities or extremes the schools must be averaged if the results are to have any valid significance. To this process and its results we now turn.

In the computations by which the results are obtained for our conclusions the B's as well as the A's are again included as they were in part one. The process used has been referred to as an averaging of percentages of each mark for the eight schools, but this is not an exact description of what was done, although the results are practically those obtained by averaging. The exact method used was to add the A's given in all the schools for any one subject and then determine what per cent. this number was of the total number of marks given in the same subject throughout the eight schools. For example, it was found that there were in all 710 marks given the nonresident pupils in geometry of which 351 or 49.5% were A's. The complete results for A's and B's in all eight subjects are found in Table V below.

TABLE V.

PERCENTAGE OF A'S AND B'S BY SUBJECT FOR EIGHT SCHOOLS

A's

	Alg.	Geom.	Lat.	Ger.	Eng.	Hist.	Phys.Sc.	Biol.Sc.
Nonresidents..	37.8	49.5	52.1	50.4	45.6	41.6	39.4	41.6
Residents.....	35.5	41.4	45.4	48.6	48.1	48.6	39	40.2
Differences....	2.3	8.1	6.7	1.8	—2.5	—7	.4	1.4

B's

	Alg.	Geom.	Lat.	Ger.	Eng.	Hist.	Phys.Sc.	Biol.Sc
Nonresidents..	42	35.2	34.5	28.9	33.8	38.1	40.7	42.4
Residents.....	41.2	36	35	33	37.2	34.8	44.8	45.7
Differences....	1.2	—.8	—.5	—4.1	-3.4	3.3	—4.1	—3.3

(The — sign is prefixed to differences disadvantageous to nonresidents.)

A study of the table discovers that the nonresident pupils range from 8.1% to .4% better than graded school pupils in A's for all but two of the subjects, their highest and lowest advantage being in geometry and physical science respectively.

The two subjects where they fell below were English and history, the amount of disadvantage being 2.5% for English and 7% for history.

A like study with reference to B's shows the same group in the lead in only two of the eight subjects, their advantage being .8% for algebra and 3.3% for history. The resident pupils have an advantage in the other six subjects ranging from .5% in Latin to 4.1% in both German and physical science. Graphs (3) and (4) following serve to illustrate these variations and include C's also.

A disadvantage for the nonresident pupils in both A's and B's is found in English, but this is made up for by their advantage in both marks in algebra. By averaging the percentage of A's in the table for all eight subjects one comes upon these results:

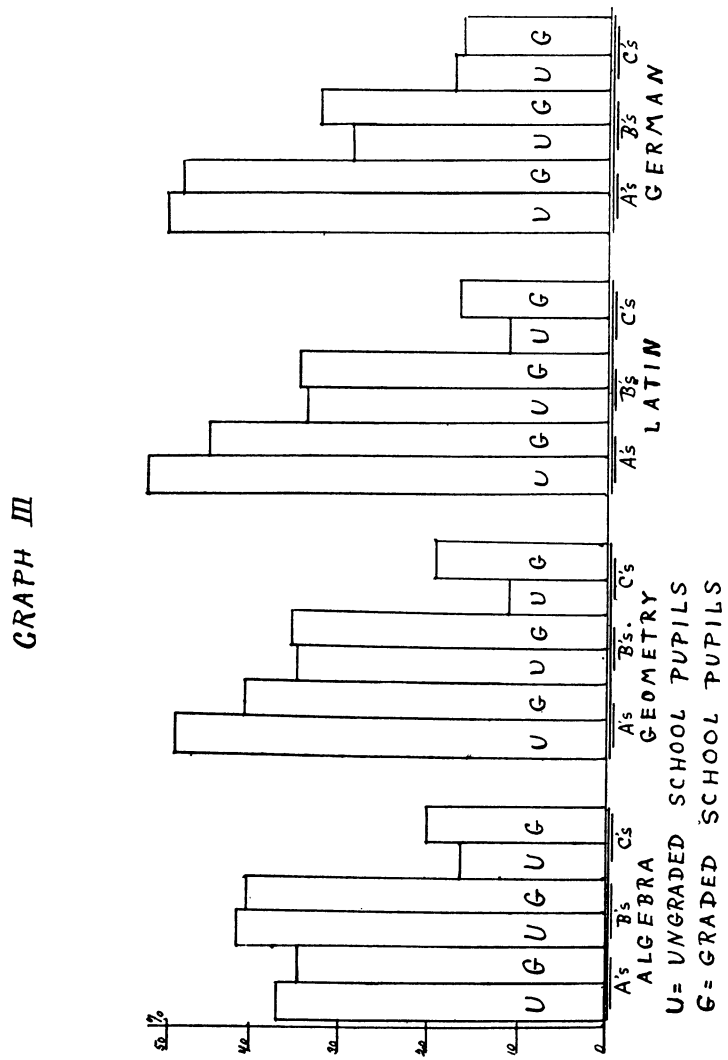
Nonresident Pupils	44.7%
Resident Pupils	43.3%
Advantage for the Nonresident Pupils	1.4%

A similar computation for the B's shows an advantage in that grade of 1.6% for the resident pupils. (If these advantages in A's and B's be compared according to points, with A's valued 10 points more than B's, the nonresidents are found to be 12.4 points to the good.)

In seeking an explanation for the advantage of the nonresident pupils over the resident ones in six of the subjects and their disadvantage in the other two one is obliged again to glance back to their earlier schooling. For algebra, geometry and Latin where their advantage is greatest, the nonresidents are undoubtedly given preparation during their elementary education by the formal drill in the processes and definitions of arithmetic and in the rules, conjugations and declensions of English grammar. This formal and routine presentation of the subjects takes little skill and the mediocre teachers which are so often forced upon the rural schools are seldom qualified with any other method. The rural pupils are therefore poorly taught in English and history where the formal methods are least effective and consequently fall below their fellows in these subjects in high school. English, in fact, is hardly taught at all in most of the rural schools of Michigan except for a few months cram in preparation for

the County Eighth Grade examinations and perhaps the memorization of a few short poems.

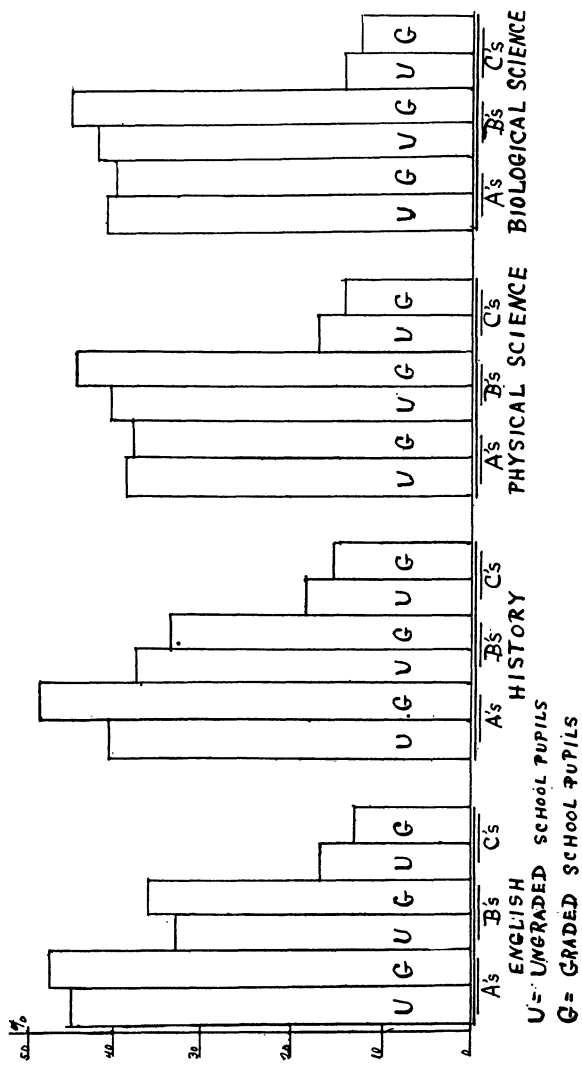
Most graded schools, on the contrary, where they invariably have better prepared teachers, give considerable time to com-



position and the appreciative study of literature and history and comparatively little to formal grammar and to the memorizing, alone, of poems, or of dates and isolated facts of history.

Such schools have their grammar school pupils spend more time on English and history and less on arithmetic and formal grammar than is done in the rural schools and as a consequence their pupils are perhaps less well prepared for the mathematics

GRAPH IV



and classical languages than are the rural pupils when they come on to high school. This is especially true in the smaller high schools of the state since these schools still tend to present their

mathematics and classical languages largely from the disciplinary standpoint. Altogether one may say that the rural pupils are prepared in their earlier schooling for the subjects in which they fall below. Just the same reflection would hold for the resident pupils where they are in the lead.

The general conclusions for this part of the study have practically all appeared in the discussion. They may be summarized in a few brief statements as follows:

1. The resident pupils have an advantage over the nonresidents only in English and history, the more indefinite subjects. The nonresidents have a considerable advantage in mathematics, languages and science, which are the more definite studies, the ones where formal methods are most effective. The advantage of the latter group by subject is as follows,—algebra 2.3%, geometry 8.1%, Latin 6.7%, German 1.8%, physical science .4% and biological science 1.4%. The disadvantage of the same group is 2.5% in English and 7% in history.

2. For all the subjects taken together the nonresidents have an advantage of 1.4% in A's and only 1.6% the disadvantage in B's whereby it may be said that the nonresidents excel in the superior grades obtained in high school.

3. The weak points for rural pupils in high school are English and history. The resident pupils surpass them in English for both A's and B's.

4. The nonresident pupils seem to have a special excellence in mathematics. They surpass the residents in both A's and B's in algebra and have an advantage of 8.1% of A's in geometry.

In conclusion it may be said that the study in neither of its parts is extensive enough to be urged as positive evidence of conditions which generally exist. It is believed, however, that it does show tendencies among the type of schools studied. The vast number of such schools would suggest that a study more intensive as well as extensive would be abundantly worth while.

If there are subjects in which nonresident pupils tend to excel and others in which they tend to fall below their resident school fellows, as the present study seems to indicate, and if there are periods in their high school cycle when the same group tends to fall below in all the work and other periods in which it tends to excel in all, then the causes for these phenomena ought surely to be sought. The causes once known it would be a far more easily achieved function of our schools to provide the corrections which such conditions cry for.

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